

"Clean Copy"



THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Serial No.: 10/035,987
Filed: December 24, 2001
Title: Optimized Image Delivery ...
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Group: 2155
Confirmation No.: 3638
Attorney Docket: FLVT3001

This is submitted in response to the Office Action of March 28 2006.

CLAIM AMENDMENTS

1. (currently amended) A method of retrieving large-scale images over network communications channels for display on a client embedded device with limited computing capabilities for a mapping / topographic application, said method comprising the steps of: a) selecting, based on an operator controlled image viewpoint relative to a predetermined image, an update image parcel to display via said client device; b) preparing a request for said update image parcel, wherein said request is associated with a request queue; c) issuing said request over a communications channel; d) receiving said update image parcel from said communications channel; and e) displaying said update image parcel as a part of said predetermined image, wherein said update image parcel uniquely forms a discrete portion of said predetermined image, wherein the operator controlled image viewpoint encompasses a viewing frustum placed within a three-dimensional space over the predetermined image.

2. (original) The method of claim 1 wherein said communications channel is a packetized communications channel and wherein said update image parcel is received from said packetized communications channel in a single data packet.

3. (original) The method of claim 2 wherein said single data packet contains said update image parcel as a compressed data representation of said discrete portion of said predetermined image.

4. (original) The method of claim 3 wherein said single data packet contains said update image parcel as a fixed compression ratio representation of said discrete portion of said predetermined image.

5. (original) The method of claim 2 wherein said update image parcel contains pixel data in a fixed size array independent of the pixel resolution of said predetermined image.

6. (original) The method of claim 5 wherein said step of preparing includes associating a prioritization value to said request, wherein said prioritization value is based on the resolution of said update image parcel relative to that of other image parcels previously received by said client device, and wherein said step of issuing said request is responsive to said prioritization value for issuing said request in a predefined prioritization order.

7. (original) The method of claim 6 wherein said prioritization values is further based on the relative distance of said update image parcel from said operator controlled image viewpoint.

8. (currently amended) A method of transferring large-scale images over a network with limited communications bandwidth, to a client embedded device with limited computing capabilities for a mapping / topographic application, said method comprising: a) requesting image parcels from a network image parcel server providing for a progressive resolution enhancement of a defined image and subject further to an ordering reflecting a current image view point relative to said defined image; b) receiving image parcels from said network image parcel server, wherein said image parcels includes fixed dimension arrays of image pixel data; and c) displaying said image parcels as corresponding portions of said defined image, wherein the current image viewpoint encompasses a viewing frustum placed within a three-dimensional space over the defined image.

9. (original) The method of claim 8 wherein said step of displaying includes a step of rendering of said fixed dimension arrays of image pixel data to a display of predetermined resolution wherein said fixed dimension arrays of image pixel data are

sampled to obtain arrays of display pixel data corresponding to said predetermined resolution.

10. (original) The method of claim 9 wherein said image parcels received from said network image parcel server are received through a packetized network and wherein said fixed dimension arrays of image data are sized such that said image parcels are received in respective network packets.

11. (original) The method of claim 10 wherein said fixed dimension arrays of image data are block compressed using a fixed ratio compression algorithm.

12. (original) The method of claim 11 wherein said fixed dimension arrays of image data have a minimum dimension of 1616' pixels.

13. (currently amended) A method of transferring a large-scale image over a network with limited communications bandwidth for display on a client device with limited computing capabilities and having a screen of limited resolution, said method for a mapping / topographic application and comprising: a) selecting, for update, an image parcel having a defined parcel resolution and corresponding to a defined portion of a defined image that is displayed on a screen of defined screen resolution, wherein selection of said image parcel provides for a progressive resolution enhancement of said defined image subject to said defined parcel resolution being less than or equal to said defined screen resolution; b) requesting said image parcel from a network image parcel server by reference to said defined portion of said defined image from an image viewpoint that encompasses a viewing frustum placed within a three-dimensional space over the defined image; c) receiving said image parcel from said network image parcel server in a single data packet as a fixed dimension array of image pixel data; and d) displaying said image parcel as said defined portion of said defined image.

14. (original) The method of claim 13 wherein said defined image is displayed as a mesh composite of a plurality of current image parcels and wherein said step of requesting provides for prioritizing the request of said image parcel among a plurality of pending requests for image parcels, wherein the relative priority of said image parcel is based on the difference in said defined parcel resolution and the resolution of said plurality of current image parcels.

15. (original) The method of claim 14 wherein the relative priority of said image parcel is further based on the distance between said image parcel and a current image viewpoint relative to said defined image.

16. (original) The method of claim 15 wherein said fixed dimension array of image pixel data has a minimum dimension of 1616' pixels.

17. (original) The method of claim 16 wherein said fixed dimension array of image pixel data is block compressed to fit said image parcel in said single data packet.

18. (original) The method of claim 17 wherein said fixed dimension array of image pixel data is block compressed using a fixed ratio compression algorithm.

19. (currently amended) A display system for displaying a large-scale image retrieved over a limited bandwidth communications channel, said display system comprising: a) a display of defined screen resolution for displaying a defined image on a client device with limited computing capabilities; b) a memory providing for the storage of a plurality of image parcels displayable over respective portions of a mesh corresponding to said defined image; c) a communications channel interface supporting the retrieval of a defined image parcel; and d) a processor coupled between said display, memory and communications channel interface, said processor operative to select said defined image parcel, retrieve said defined image parcel via said communications channel interface for storage in said memory, and uniquely render said defined image parcel over a discrete portion of said mesh to provide for a progressive resolution enhancement of said defined image on said display, said defined image from an image viewpoint that encompasses a viewing frustum placed within a three-dimensional space over the defined image.

20. (original) The display system of claim 19 wherein said processor is responsive to said defined screen resolution and wherein said processor is operative to limit selection of said defined image parcel to where the resolution of said defined image parcel is less than or equal to said defined screen resolution.

21. (original) The display system of claim 20 wherein said processor is operative to prioritize the retrieval of said image parcel among a plurality of selected image parcels pending retrieval, wherein the relative priority of said image parcel is based on the difference in the resolution of said image parcel and the resolution of said plurality of selected image parcels.

22. (original) The display system of claim 21 wherein said processor is response to user navigation commands to define an image viewpoint relative to said defined image and wherein said processor is further operative to prioritize the retrieval of said image parcel based on the distance between said image parcel and said image image viewpoint relative to said defined image.

23. (New) A method of transferring a large-scale image over a network with limited communications bandwidth for display on a client device having a screen of limited resolution, said method comprising: a) selecting, for update, an image parcel having a defined parcel resolution and corresponding to a defined portion of a defined image that is displayed on a screen of defined screen resolution, wherein selection of said image parcel provides for a progressive resolution enhancement of said defined image subject to said defined parcel resolution being less than or equal to said defined screen resolution; b) requesting said image parcel from a network image parcel server by reference to said defined portion of said defined image; c) receiving said image parcel from said network image parcel server in a single data packet as a fixed dimension array of image pixel data; and d) displaying said image parcel as said defined portion of said defined image, wherein:

- (i) said defined image is displayed as a mesh composite of a plurality of current image parcels and wherein said step of requesting provides for prioritizing the request of said image parcel among a plurality of pending requests for image parcels, wherein the relative priority of said image parcel is based on the difference in said defined parcel resolution and the resolution of said plurality of current image parcels;
- (ii) the relative priority of said image parcel is further based on the distance between said image parcel and a current image viewpoint relative to said defined image;
- (iii) the fixed dimension array of image pixel data has a minimum dimension of 1616' pixels and is block compressed to fit said image parcel in said single data packet.

24. (New) The method of claim 23 wherein said fixed dimension array of image pixel data is block compressed using a fixed ratio compression algorithm.